REMARKS

The allowable nature of claims 3 and 5 is acknowledged. As a result, claims 3 and 5 have been rewritten in independent form. Since there are now only three (3) independent claims, no new fee is required. Claims 3-13 are thus in condition for allowance.

Claims 1 and 2 have been rejected under 35 U.S.C. §102 as being anticipated by U.S. Patent No. 4,058,100 (hereinafter Tanaka). Tanaka provides a mechanism to vary the air fuel mixture entering the combustion chamber according to the position of the throttle. For example, according to column 2, lines 15-19, Tanaka provides a "flow rate measuring device in which the degree of opening of the sensing vane may be automatically controlled in response to the load on the engine so that the optimum richer fuel air mixture may be provided under high and/or low load condition (sic) of the engine." To that end, Tanaka includes a shaft 5 carrying a sensing vane 6 supported in an air intake pipe 1. According to column 2, lines 57-59, the shaft 5 "is operatively coupled to a conventional metering system to control the flow rate of the fuel [i.e. the amount of fuel in the air fuel mixture] supplied into the engine in response to the angular displacement" of the sensing vane 6. The ease with which the sensing vane 6 opens is controlled by the spring 10 and connecting rod 8. The force of the spring 10 can be overcome by the flow rate of air fuel mixture through the intake pipe 1, and by the connecting rod 8.

As seen in Fig. 1 of Tanaka, the connecting rod 8 is coupled to a diaphragm 12. The position of the diaphragm 12, and, hence the force imparted by the connecting rod 8 to overcome the spring 10, is controlled by the load placed on the engine. For example, a cam 33 operatively connected to the throttle is provided to affect the operation of a diaphragm valve 15, which, in turn, affects the position of the diaphragm 12. When the throttle is operated to produce high or low engine loads, the cam 33 affects the diaphragm valve 15 to insure that the diaphragm 12 is positioned so that the connecting rod 8 overcomes some of the force imparted by the spring 10. As such, the throttle ultimately affects the position of the connecting rod 8

such that, at high or low engine loads, the sensing vane 6 responds to a particular flow rate of air fuel mixture with a larger amount of angular displacement. Consequently, because the shaft 5 is operatively connected to the conventional fuel metering system, Tanaka provides a mechanism to control the richness of the air fuel mixture according to the amount of angular displacement of the sensing vane 6, and accordingly insures that a richer air fuel mixture is supplied when the throttle is operative to produce high and/or low engine loads.

Unlike Tanaka, however, the present invention is provided to overcome compromises made in intake valve timing for accommodating variable speeds of an internal combustion engine. Generally, the intake valves of internal combustion engines are timed to open and close to accommodate various engine speeds. For example, the Specification at page 7, lines 25-31, states: "if the engine 20 is operating at low speeds, the intake valve 50 would ideally be opened when the piston 29 is at the first position 31 and close when the piston is at the second position 32. Furthermore, if the engine 20 is operating at high speeds, the intake valve 50 would ideally be open before the piston 29 reaches the first position 31 and close after the piston 29 reaches the second position 32. At both low and high speeds, the ideal movements of the intake valve 50 allows a maximum amount of air fuel mixture to enter the combustion chamber 21." However, compromises are made in the timing of the intake valve to accommodate variable speeds of engine 20. As such, as seen in Fig. 1, the intake valve 50 of the engine 20, like most internal combustion engines, is opened before the piston reaches the position 31 and closed after the piston reaches position 32.

The auxiliary valve 10 of the present invention is provided to overcome the undesirable effects of the earlier opening and later closing of the intake valve 50 when the engine 20 is operating at low speeds. For example, the Specification at page 11, lines 6-10, teaches: "even though the intake valve 50 is opened before the intake stroke begins, the auxiliary valve 10 remains closed, and there is no communication between the intake passage 36 upstream of the auxiliary valve 10 and combustion chamber 21 before the piston 29 reaches

top dead center, and thereafter begins moving downwardly." That is, at low speeds, the auxiliary valve 10 is configured to remain closed until the piston 29 begins moving downwardly during the intake stroke. To that end, the auxiliary valve 50 includes a swingable door 72 which is biased in a closed position, but is capable of pivotable movement between the closed position and an opened position. Accordingly, "the bias of the swingable door 72 [to remain in the closed position] can be overcome when the pressure in the combustion chamber 21 is lower then the pressure upstream of the auxiliary valve 10" (Specification, page 11, lines 2-4). Therefore, "when the internal combustion engine 20 is operating at low speeds, the bias can only be overcome by the suction provided by the downward movement of the piston 29" (Specification, page 11, lines 4-6). As such, the auxiliary valve 10 serves to overcome undesirable effects caused by the earlier opening and later closing of the intake valve 50. The auxiliary valve 10 remains closed to limit access to the combustion chamber 21 before and after the intake stroke of the piston 29 when the internal combustion engine 20 is operating at low speeds. Consequently, the present invention is provided to overcome compromises made in intake valve timing for accommodating variable speeds of an internal combustion engine.

Claim 1 has been amended to make these differences clearer. For example, amended claim 1 now recites "a spring loaded assembly biasing said swingable door in a closed position, wherein, when the four-cycle internal combustion engine is operating at low speeds, the bias of said spring loaded assembly can be overcome to open said swingable door during the intake stroke of the four-cycle internal combustion engine." Unlike the present invention as claimed in amended claim 1, Tanaka provides a mechanism to control the richness of the air fuel mixture according to the amount of angular displacement of the sensing vane 6. As such, Tanaka is not configured as a valve to completely limit access to a combustion chamber. Consequently, it is submitted that the Applicant's invention as claimed in amended claim 1 is in no way taught or suggested by Tanaka. Therefore, amended claim 1 and dependent claim 2 depending from claim 1 are deemed allowable.

Reconsideration by the Examiner and the issuance of a Notice of Allowance of claims 1 and 2, as well as claims 3-13, is earnestly solicited. Should the Examiner wish to discuss any of the foregoing in more detail, the undersigned attorney would welcome a telephone call.

Respectfully submitted,

Edward G. Greive

Edward G. Greive, Reg. No. 24,726
Renner, Kenner, Greive, Bobak, Taylor & Weber
First National Tower - Fourth Floor
Akron, Ohio 44308-1456
Telephone: (330) 376-1242
Facsimile: (330) 376-9646
E-mail: eggreive@rennerkenner.com

Attorney for Applicant

Dated: Nov. 10, 2004